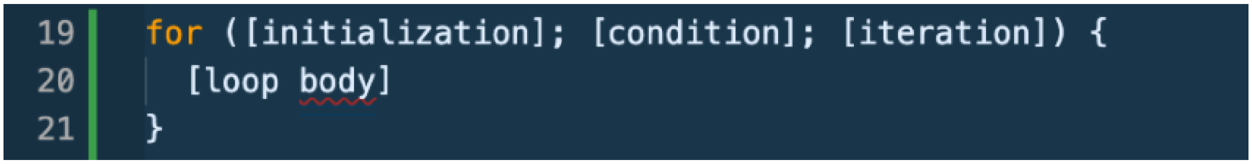
For Loops

For Loops

- Let’s say you want to display Masala Dosa one time then you will print do the console.log("Masala Dosa") one-time.
- Similarly, If it is two then you will write console.log twice
- Let’s say you want to display it 100 times. Without some sort of loop in your code, we would probably have to write the same line of code 100 times.

A *for-loop* can help us to do so by running the same code repeatedly under certain conditions.

Syntax



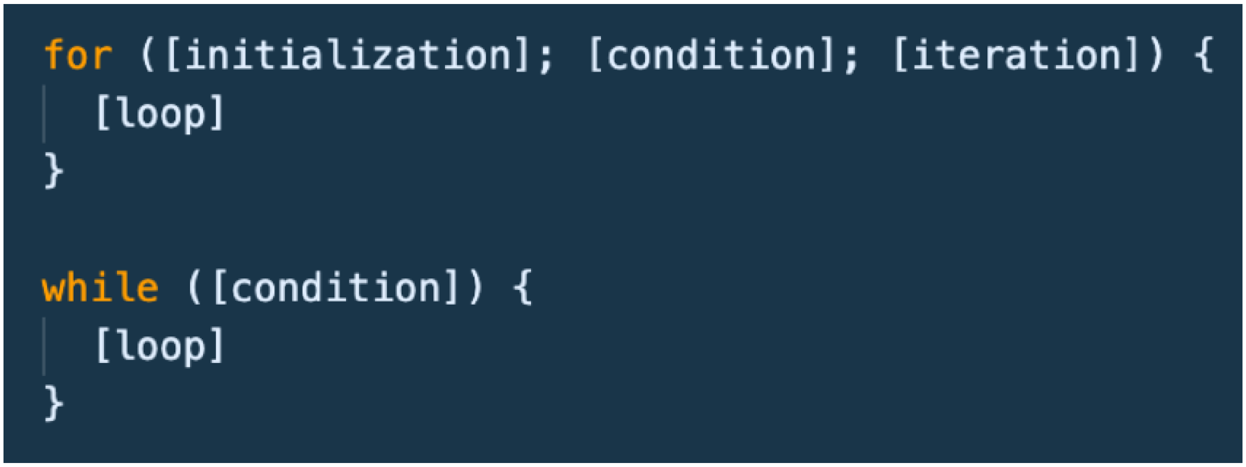
```
for ([initialization]; [condition]; [iteration]) {
  [loop body]
}
```

1. Initialization : Decides starting point of a loop
2. Condition : Condition is checked before the execution of every iteration. If it evaluates to true, the loop's statement is executed. If it evaluates to false, the loop stops.
3. Iteration : Iteration is used to affect your counter.It can be increment / decrement.
4. Loop Body : The loop body repeats the code as long as the condition part is TRUE.

Three Ways of Writing For Loop

1. **for** (*initialize*; *condition*; *increment*)***;***
2. **for** (*initialize*; *condition*; *increment*) ***single statement;***
3. **for** (*initialize*; *condition*; *increment*) { ***multiple; statements;*** }

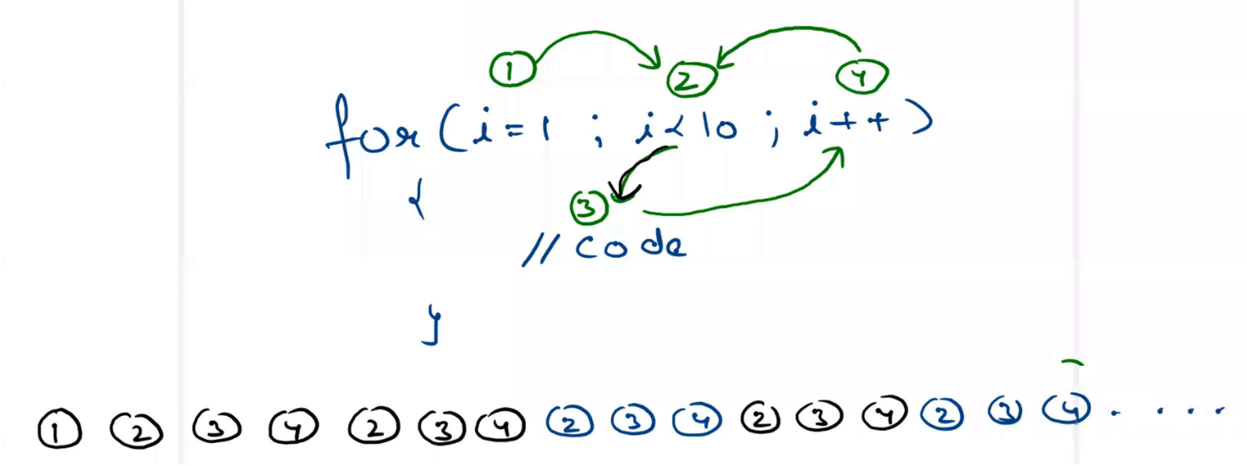
Comparing For Loop Vs While Loop



```
for ([initialization]; [condition]; [iteration]) {
    [loop]
}

while ([condition]) {
    [loop]
}
```

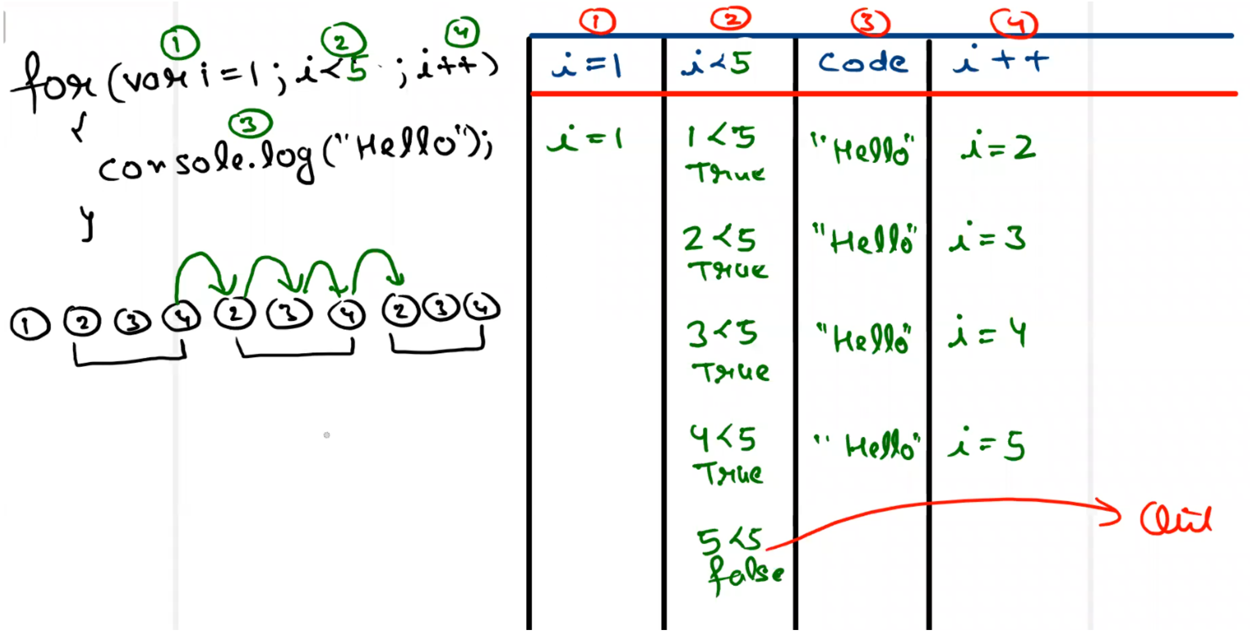
The sequence of Execution of For Loop



1. Initialization -> Condition -> Loop Body -> Iteration -> Condition -> Loop Body -> Iteration and so one
2. Initialization denoted as 1, Condition denoted as 2, Loop Body denotes as 3, Iteration denoted as 4.
3. Sequence of Execution will be : 1 -> 2 -> 3 -> 4 -> 2-> 3 -> 4 -> 2 -> 3 -> 4 and so on

Examples of For Loop with Dry Run

Example 1: Print Hello 5 times.



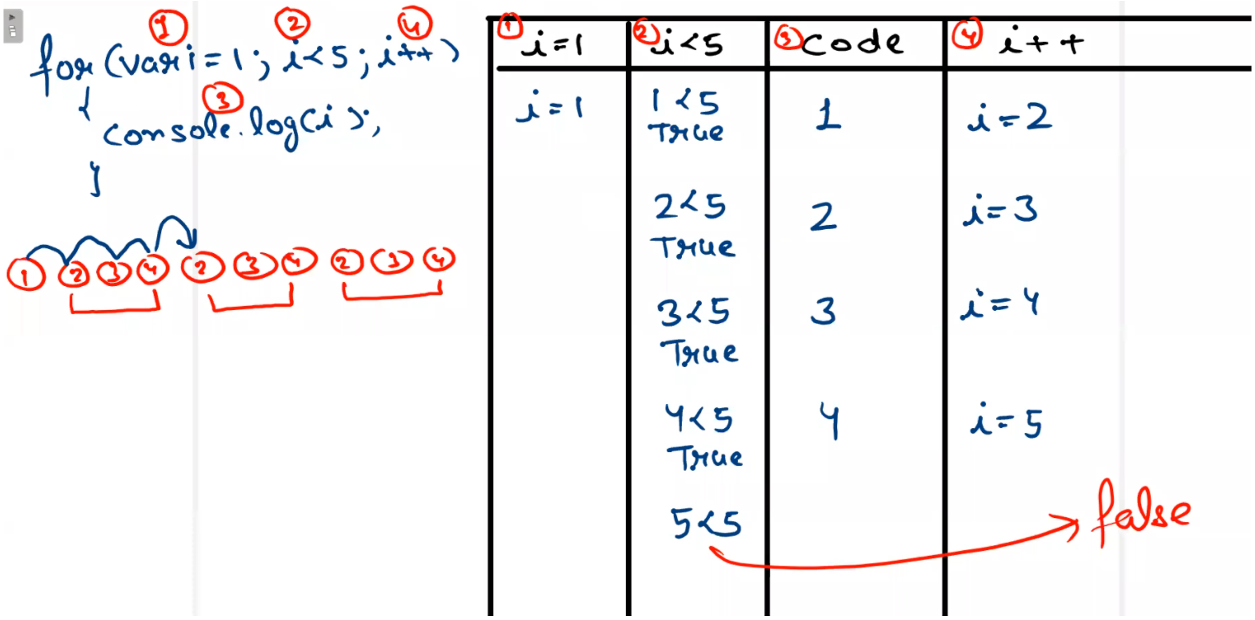
```
for (var i=1 ; i<5 ; i++)
{
  console.log("Hello");
}
```

1	2	3	4
i=1	i<5	code	i++
i=1	1<5 True	"Hello"	i=2
	2<5 True	"Hello"	i=3
	3<5 True	"Hello"	i=4
	4<5 True	"Hello"	i=5
	5<5 false		

Code 1 : Print Hello 5 times.

```
for(var i=0; i<5; i++)
{
  console.log("Hello");
}
```

Example 2: Print Values from 1 to 5



```
for (var i=1; i<5; i++)
{
  console.log(i);
}
```

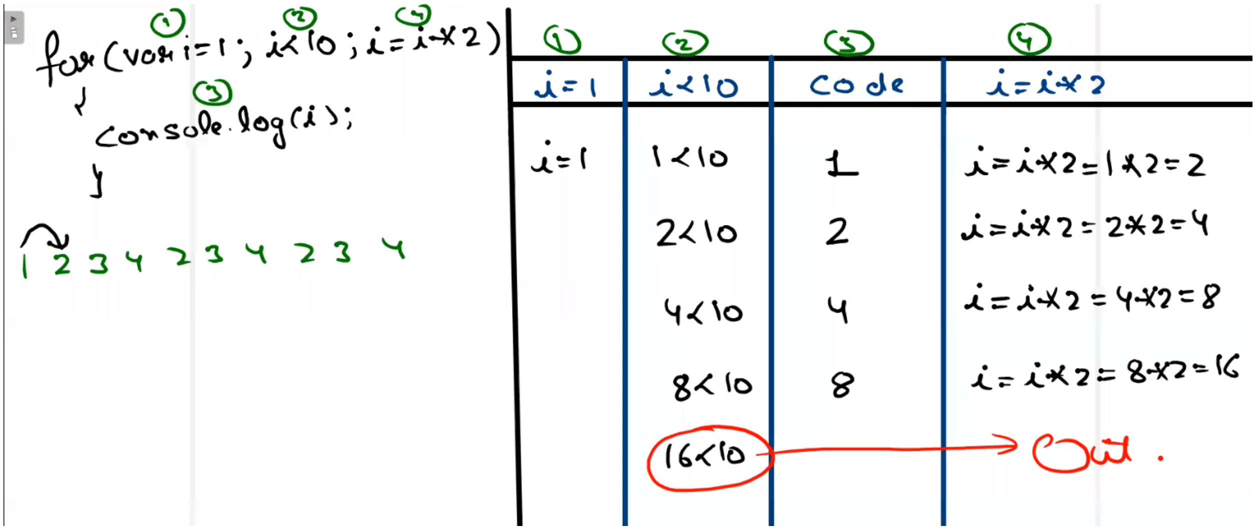
① i=1	② i<5	③ code	④ i++
i=1	1<5 True	1	i=2
	2<5 True	2	i=3
	3<5 True	3	i=4
	4<5 True	4	i=5
	5<5		false

Code 2 : Print Values from 1 to 5

```
// Ist way : Output on new line
for(var i = 1; i<=5; i++){
  console.log(i);
}

// IInd way : Output on single line
var bag="";
for(var i = 1; i<=5; i++){
  bag = bag + i + " ";
}
console.log(bag);
```

Example 3: Print multiple of 2 values from 1 to 10



```
for(var i=1; i<10; i=i*2)
{
  console.log(i);
}
```

1 2 3 4 2 3 4 2 3 4

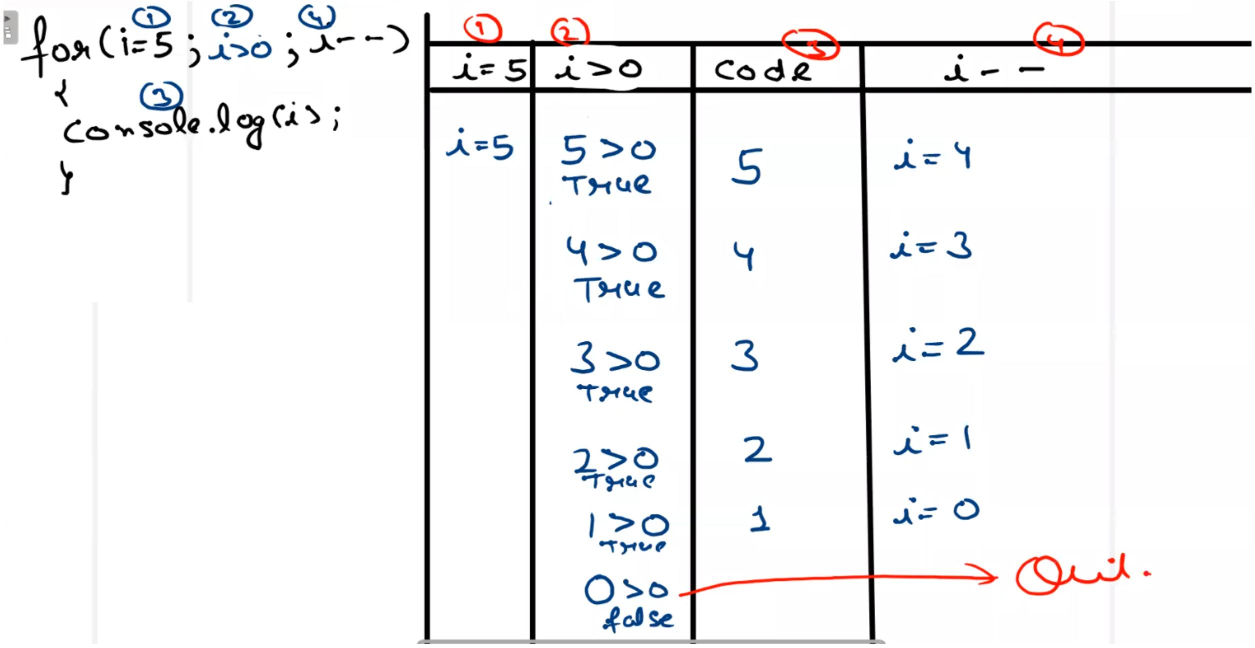
① i=1	② i<10	③ code	④ i=i*2
i=1	1<10	1	i=i*2=1*2=2
	2<10	2	i=i*2= 2*2=4
	4<10	4	i=i*2 = 4*2=8
	8<10	8	i= i*2= 8*2=16
	16<10		→ Out .

Code 3 : Print multiple of 2 values from 1 to 10

```
// Ist way : Output on new line
for(var i = 1; i<=10; i=i*2){
  console.log(i);
}

// IInd way : Output on single line
var bag="";
for(var i = 1; i<=10; i=i*2){
  bag = bag + i + " ";
}
console.log(bag);
```

Example 4: Reverse Loop from 5 to 1



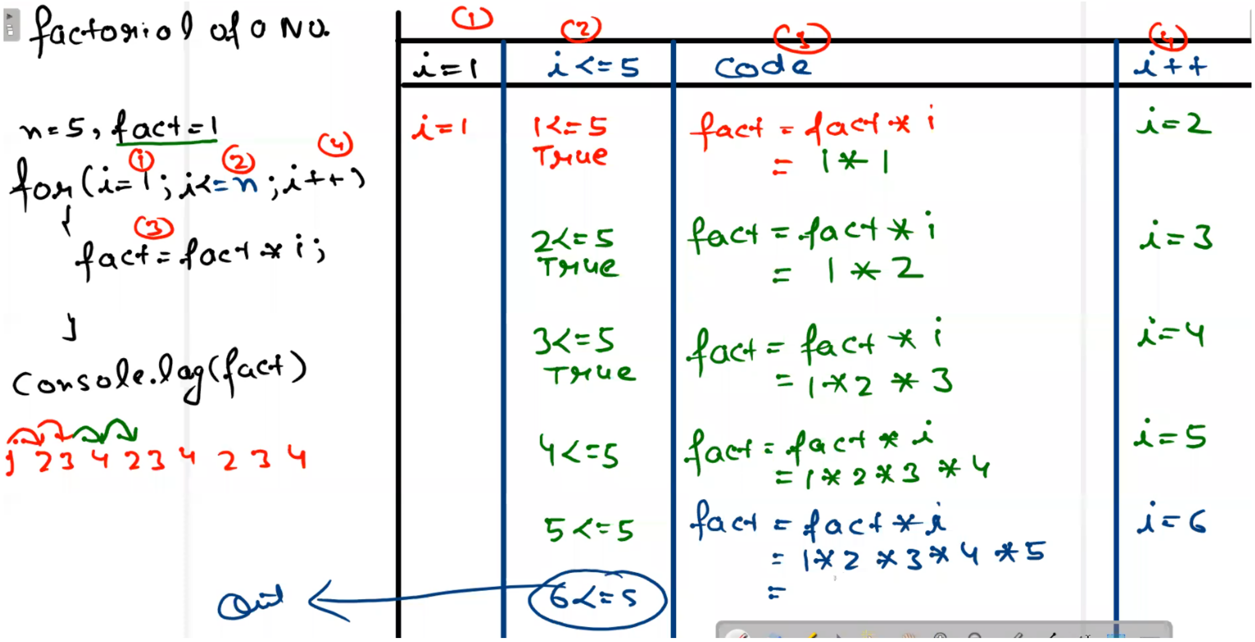
```
for(i=5; i>0; i--)
{
console.log(i);
}
```

i=5	i>0	code	i--
i=5	5>0 True	5	i=4
	4>0 True	4	i=3
	3>0 True	3	i=2
	2>0 True	2	i=1
	1>0 True	1	i=0
	0>0 false		→ Quit.

Code 4 : Reverse Loop from 5 to 1

```
var bag = "";
for(var i = 5; i>0; i--){
  bag = bag + i + " ";
}
console.log(bag);
```

Example 5: Factorial



factorial of o No.

```
n=5, fact=1
for(i=1; i<=n; i++)
{
  fact=fact*i;
}
console.log(fact)
```

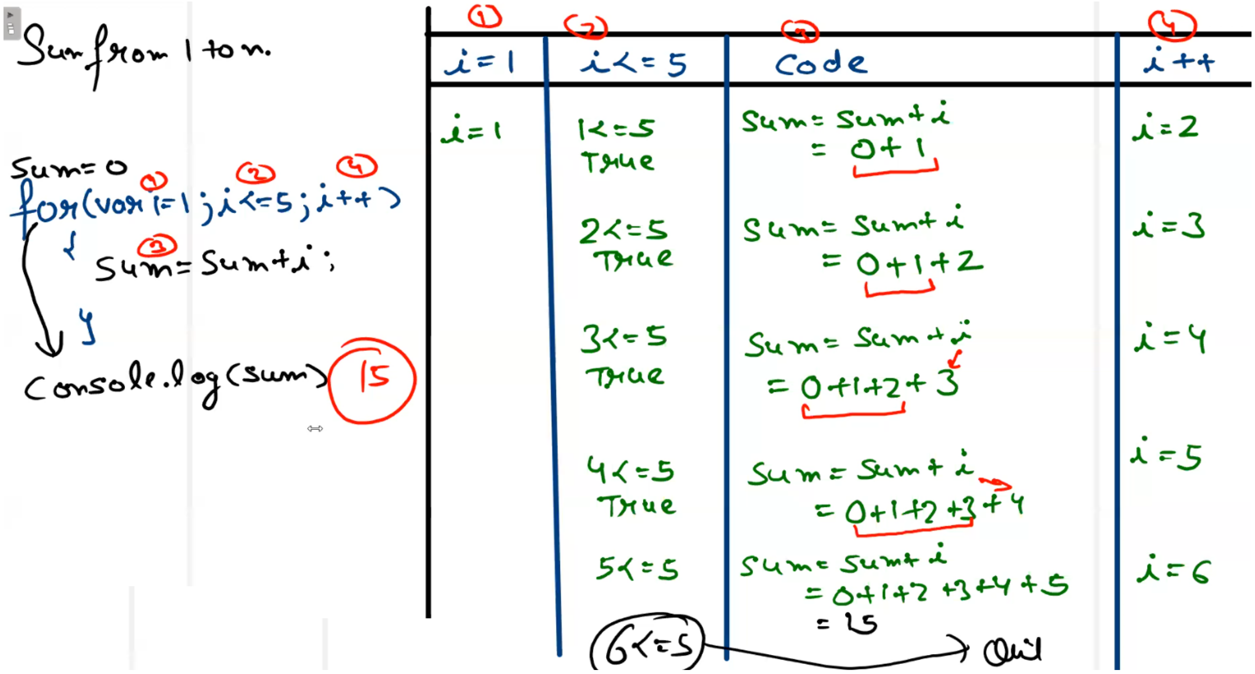
1 2 3 4 2 3 4 2 3 4

① i=1	② i<=5	③ Code	④ i++
i=1	1<=5 True	fact = fact * i = 1*1	i=2
	2<=5 True	fact = fact * i = 1*2	i=3
	3<=5 True	fact = fact * i = 1*2*3	i=4
	4<=5	fact = fact * i = 1*2*3*4	i=5
	5<=5	fact = fact * i = 1*2*3*4*5 =	i=6
Out	6<=5		

Code 5 : Factorial

```
var fact = 1;
for(var i=1; i<=5;i++)
{
  fact = fact * i;
  console.log(fact);
}
```

Example 6: Find Sum 1 to N



Sum from 1 to n.

```
sum=0
for(var i=1;i<=5;i++)
{
  sum=sum+i;
}
console.log(sum) 15
```

① i=1	② i<=5	③ Code	④ i++
i=1	1<=5 True	sum=sum+i = 0+1	i=2
	2<=5 True	sum=sum+i =0+1+2	i=3
	3<=5 True	sum=sum+i =0+1+2+3	i=4
	4<=5 True	sum=sum+i =0+1+2+3+4	i=5
	5<=5	sum=sum+i =0+1+2+3+4+5 =15	i=6
	6<=5 → Quit		

Code 6 : Find Sum 1 to N

```
var N = 5;
var sum = 0;
for(var i = 1; i<=N; i++){
  sum = sum + i;
}
console.log(sum);
```

Break

Guest Analogy

- There are 10 guests came to my home, After 2-3 days they decided to leave.
- They all have the train on the same day and at the same time.
- I need to drop them at the railway station but I have one bike which can only take one person at a time.
- In this case, I need to drop each guest one by one.

- Taking the First guest to the railway station, dropping them and arrive back and follow the same procedure again and again till the end.
- Suppose I took the First Guest and dropped him to the Railway station and come back.
- Again I took the Second Guest and follow the same.
- Now, Next I took the third guest to Railway station and found that Train has gone.

So, Will I continue the above procedure or stopped it ?

Obviously, I will stop it and wait for tomorrow.

Code 7 : Loop from 1 to 10 (using break). Using console.log before break statement

```
for(var guest=1; guest<=10; guest++)
{
  console.log("guest ",guest,"got the train");

  if(guest == 3){
    break;
  }
}
```

Code 8 : Loop from 1 to 10 (using break). Using console.log after break statement

```
for(var guest=1; guest<=10; guest++)
{
  if(guest == 3){
    break;
  }
  console.log("guest ",guest,"got the train");
}
```

Continue

Guest Analogy

- There are 10 guests coming to my home, After 2-3 days they decided to leave their home.

- They all have the train on the same day and at the same time.
- I need to drop them at the railway station but I have one bike which can only take one person at a time.
- In this case, I need to drop each guest one by one.
- Taking the First guest to the railway station, dropping them and arrive back and follow the same procedure again and again till the end.
- Suppose I took the First Guest and dropped him to the Railway station and come back.
- Again I took the Second Guest and follow the same.
- Suppose the third guest is Sick, In that case I will skip him.
- and I will continue with the fourth guest and follow the same procedure.

Code 9 : Loop from 1 to 10 (using Continue). Using console.log before continue statement

```
for(var guest=1; guest<=10; guest++)
{
  console.log("guest ",guest,"got the train");

  if(guest == 3){
    continue;
  }
}
```

Code 10 : Loop from 1 to 10 (using Continue). Using console.log after continue statement

```
for(var guest=1; guest<=10; guest++)
{
  if(guest == 3){
    continue;
  }
  console.log("guest ",guest,"got the train");
}
```

Code 11 : Predict the output.

```
var count = 1;
for(var i = 1; i<10; i++)
{
  count++;

  if(i==5){
    continue;
  }
}
console.log(count);
```

Code 12 : Predict the output.

```
var count = 1;
for(var i = 1; i<10; i++)
{
   if(i==5){
    continue;
  }
  count++;
}
console.log(count);
```